PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference B3020-PCT	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/BE2004/000150	International filing date *(day/month/year)* 21.10.2004	Priority date *(day/month/year)* 21.10.2003
International Patent Classification (IPC) or national classification and IPC H04N13/00, G03B35/26		
Applicant BARCO N.V. et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 5 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☒	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19.08.2005	30.01.2006
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Rückerl, R Telephone No. +49 89 2399-6999

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/BE2004/000150

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-28 as originally filed

Claims, Numbers

1-40 received on 04.01.2006 with letter of 04.01.2006

Drawings, Sheets

1/16-16/16 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees, the applicant has:
   - ☐ restricted the claims.
   - ☐ paid additional fees.
   - ☐ paid additional fees under protest.
   - ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with.

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos. .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	7-10,20,22,24-26,37,39,40
	No:	Claims	1-6,11-19,21,23,27-36,38
Inventive step (IS)	Yes:	Claims	8,9,22
	No:	Claims	1-7,10-21,23-40
Industrial applicability (IA)	Yes:	Claims	1-40
	No:	Claims	

2. Citations and explanations (Rule 70.7):

   see separate sheet

Re Item IV

Lack of unity of invention

This authority considers that there are two inventions covered by the claims indicated as follows:

I: **Claims 1-10, 26** and **claims 25, 27-40** as far as they are referred to **claim 1** are directed to a system comprising a projection device which is provided with a color selective light filter and a means for switching between light in different wavelength bands.

II: **Claims 11-24** and **claims 25, 27-40** as far as they are referred to **claim 11** are directed to a system comprising two projection devices, each of which is provided with a combination of two filters, one of these filters being a color selective light filter.

The common concept linking together the independent **claims 1** and **11** is that of a system comprising a projection device which is provided with a color selective light filter.
This common concept is not novel in the light of document **D1**, see the argumentation of point V-1 below.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents, their order follows the order of the search report:

D1: **DE 101 31 683 A1** (CARL ZEISS JENA GMBH) 20 February 2003
D2: **US 5 121 983 A** (LEE ET AL) 16 June 1992
D5: **US 2003/112507 A1** (DIVELBISS ADAM ET AL) 19 June 2003

Further reference is made to the following document cited in the description of the present application:

D12: **DE 199 24 167 A1** (DaimlerChrysler AG) 7 December 2000

1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** is not novel in the sense of Article 33(2) PCT.

The document **D1** discloses (the references in parentheses applying to this document; see figure 1) a stereoscopic projection system comprising:

i) a projection device (1) with a filter (3) which filters a parameter of the light in a color selective manner,

ii) the filtering in a color selective manner being for obtaining stereoscopic images for a left eye and a right eye, respectively (paragraphs [0035] and [40], or paragraph [0024]),

iii) the filter having a spectral characteristic for transmitting light in a first wavelength band or set of wavelength bands and for reflecting or absorbing light in a second wavelength band or set of wavelength bands, wherein

iv) the projection device comprises a means (3; see paragraph [0024]) for fast synchronized switching between light in different wavelength bands or sets of wavelength bands.

The wording of claim 1 specifies a color selective filtering for obtaining images, wherein these images are stereoscopic images (see passage ii).
However, **claim 1** does not make clear, that the color selective filtering is used to create the stereoscopic effect of the stereoscopic image.

Although **D1** discloses a projector using a polarisation selective filtering to obtain a stereoscopic effect, this document nevertheless anticipates the subject-matter of **claim 1**, because **D1** discloses a color selective filtering which is used for obtaining images, wherein these images are stereoscopic images.

Therefore, all features defined by **claim 1** are anticipated by **D1**.

Furthermore, the definition of the "filtering" is unclear, because it is specified by functional features without defining the structural features necessary to obtain the effect. In particular, no details of the optical path of the projection system and of the arrangement of the filter relative to other features of the projection system are defined. Moreover, it appears to be essential for the system to contain an obscuration

device, e.g. as defined in **claim 3**, for creating stereoscopic images.

It is further observed, that the idea of creating a stereoscopic effect by a color selective filtering is already discussed in document **D5** (e.g. paragraph [0207], [0222]) and **D12** (abstract).

2. An analogous interpretation as that discussed in above point 1 for **claim 1** applies, mutatis mutandis, to the subject-matter of the independent **claim 11**. Therefore, **claim 11** is considered not novel in the light of document **D2**, as analogously discussed in the written opinion (point 2).

3. Dependent **claims 2-7, 12-21, 23-39** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, see the documents cited in the search report and the respectively cited passages.

   Moreover, the subject-matter of **claims 10** and **40** does not involve an inventive step, because it is already suggested by document **D12** (DE19924167), which is cited in the description of present application (see column 3, lines 32-45).

4. The combination of features defined by dependent **claims 8/9** or **22** is neither known from, nor rendered obvious by, the available prior art. The reasons are as follows:

   A split and recombined beam path comprising a shutter in each of the branches of the beam path, whereby the shutters are operating in an alternating manner such that one shutter opens when the other shutter closes, according to **claims 8** and **9**, is neither disclosed nor suggested in any of the available prior art documents.

   Moreover, the combination of two projection devices having different color filters and two passive obscuration devices having different color filters, whereby the filters are corresponding in a way as defined in **claim 22**, is neither disclosed nor suggested in

any of the available prior art documents.

What is claimed is the following:

1.- A stereoscopic projection system comprising a projection device with at least one filter which filters a parameter of the light in a color selective manner, said filtering in a color selective manner being for obtaining stereoscopic images for a left eye and a right eye, respectively, the at least one filter having a spectral characteristic for transmitting light in a first wavelength band or set of wavelength bands and for reflecting or absorbing light in a second wavelength band or set of wavelength bands, wherein the projection device comprises a means for fast synchronized switching between light in different wavelength bands or sets of wavelength bands.

2.- A stereoscopic projection system according to claim 1, comprising a projection device with at least a first filter which filters a parameter of the light in a color selective manner with a first spectral characteristic and a second filter which filters a parameter of the light in a color selective manner with a second spectral characteristic, wherein the projection device comprises a means for fast synchronized switching between the at least first and second filters.

3.- A stereoscopic projection system according to any of the previous claims, the projection device projecting images for a left eye and images for a right eye, the stereoscopic projection system furthermore comprising a passive obscuration device for discriminating between the images for the left eye and the images for the right eye.

4.- A stereoscopic projection system according to any of claims 2 or 3, wherein the means for fast synchronized switching comprises a rotating wheel with at least one set of the first and second filters.

5.- A stereoscopic projection system according to any of claims 2 or 3, wherein the means for fast synchronized switching comprises a sliding filter with at least one set of the first and second filters..

6.- A stereoscopic projection system according to any of claims 2 or 3, wherein the means for fast synchronized switching comprises a solid state filter that can switch from a first characteristic to a second characteristic with a switching time below 5 ms.

7.- A stereoscopic projection system according to any of claims 2 or 3, wherein the means for fast synchronized switching comprises a stack of switchable cholesteric filters.

8.- A stereoscopic projection system according to claim 1, wherein the at least one filter is a first filter for splitting light in a first light path and a second light path, the means for fast synchronized switching comprising a first shutter in the first light path and a second shutter in the second light path, the operation of the shutters being linked so that the first shutter closes when the second shutter opens and vice versa.

9.- A stereoscopic projection system according to claim 8, furthermore comprising a further filter with a characteristic substantially similar to the spectral characteristic of the first filter, the further filter being for combining light from the first and second lightpaths onto a combined lightpath.

10.- A stereoscopic projection system according to any of the previous claims, the at least one filter having a spectral characteristic for transmitting light in a first set of wavelength bands and for reflecting or absorbing light in a second set of wavelength bands, wherein the at least one filter has components in three primary color regions.

11.- A stereoscopic projection system comprising at least one set of a first and a second stereo projection devices for projecting images onto a common display unit, wherein each of the first and second stereo projection devices are provided with a combination of a first and a second filter mechanism, the first filter mechanism being a filter which filters a parameter of the light in a color selective manner, said filtering in a color selective manner of the first and second stereo projection devices being for obtaining stereoscopic images for a left eye and a right eye.

12.- A stereoscopic projection system according to claim 11, wherein the filter which filters a parameter of the light in a color selective manner comprises a color selective filter.

13.- A stereoscopic projection system according to claim 12, wherein the color selective filter is an absorption filter.

14.- A stereoscopic projection system according to claim 11, wherein the filter which filters a parameter of the light in a color selective manner comprises a color selective retarder.

15.- A stereoscopic projection system according to any of claims 11 to 14, wherein the second filter mechanism comprises a polarization filter.

16.- A stereoscopic projection system according to claim 15, wherein the polarization filters of the first and the second stereo projection devices have a substantially orthogonal polarization state.

17.- A stereoscopic projection system according to claim 16, wherein the polarization filter is of a type which transmits a first type of linear polarization and reflects a second type of linear polarization.

18.- A stereoscopic projection system according to claim 16, wherein the polarization filter is of a type which transmits a first handiness of circular polarization and reflects a second handiness of circular polarization.

19.- A stereoscopic projection system according to any of claims 11 to 14, wherein the second filter mechanism comprises a shutter mechanism.

20.- A stereoscopic projection system according to any of claims 11 to 19, wherein the filters which filter a parameter of the light in a color selective manner of the first and the second passive stereo projection device have overlapping regions in their spectral characteristic.

21.- A stereoscopic projection system according to any of claims 11 to 20, furthermore comprising passive obscuration devices.

22.- A stereoscopic projection system according to claim 21, wherein the passive obscuration devices comprise a pair of glasses with a first glass with a first filter mechanism with the same characteristics as the first filter mechanism of the first projection device and with a second filter mechanism with substantially the same characteristics as the second filter mechanism of the first projection device, and a second glass with a first filter mechanism with the same characteristics as the first filter mechanism of the second projection device and with a second filter mechanism with substantially the same characteristics as the second filter mechanism of the second projection device.

23.- A stereoscopic projection system according to any of claims 11 to 20, the first projection device projecting images for the left eye and the second projection device projecting images for a right eye, the projection system furthermore comprising an active obscuration device for discriminating between the images for the left eye and the images for the right eye.

24.- A stereoscopic projection system according to claim 23, wherein the first projection device alternately projects a first set of images for the left eyes of a first

group of observers and a second set of images for the left eyes of a second group of observers, and wherein the second projection device alternately projects a first set of images for the right eyes of the first group of observers and a second set of images for the right eyes of the second group of observers, the active obscuration devices comprising a shutter which is open when the first set of images is displayed and closed when the second set of images is displayed.

25.- A stereoscopic projection system according to any of the previous claims, furthermore comprising means for electronically compensating for color differences between a plurality of signals originating from the projection device or projection devices.

26.- A stereoscopic projection system according to claim 25 in as far as dependent on any of claims 1 to 10, wherein the means for electronically compensating for color differences between a plurality of signals originating from the projection device comprises means for switching on a left image – right image basis.

27.- A stereoscopic projection system according to any of the previous claims, furthermore comprising means for reducing cross-talk in the most photopically contributing color channel of the projection device.

28.- A stereoscopic projection system according to claim 27, wherein the means for reducing cross-talk comprises a filter which filters a parameter of the light in a color selective manner in the most photopically contributing channel of the projection device.

29.- A stereoscopic projection system according to claim 27, wherein the means for reducing cross-talk comprises a first filter which filters a parameter of the light in a color selective manner in the most photopically contributing color channel of the first projection device, and a second filter which filters a parameter of the light in a color selective manner in the most photopically contributing color channel of the second projection device, the first and the second filters showing no overlap in the most photopically contributing color channel.

30.- A stereoscopic projection system according to claim 29, wherein the first and second filters which filter a parameter of the light in a color selective manner each are a notch filter or a plurality of notch filters.

31.- A stereoscopic projection system according to any of the previous claims, wherein a projection device is equipped with a light source with a substantially flat spectral distribution.

32.- A stereoscopic projection system according to claim 31, wherein the projection device is furthermore equipped with a set of filters such that the combination of light source and set of filters of the projection device is such that the light which is projected by the at least two projection devices onto the common screen can be discriminated by means of an adjusted obscuration device.

33.- A stereoscopic projection system according to claim 32, wherein the light source and the set of filters of each of the at least two projection devices are such that a multiplication of the spectral distributions of the light projected by the at least two projection devices onto the common screen is substantially close to zero.

34.- A stereoscopic projection system according to any of claims 32 or 33, wherein the set of filters are stereo filters.

35.- A stereoscopic projection system according to claim 34, wherein the set of filters are color filters.

36.- A stereoscopic projection system according to any of claims 32 to 35, wherein the adjusted obscuration device is a pair of glasses.

37.- A stereoscopic projection system according to any of claims 31 to 36, furthermore comprising means for electronically compensating for color differences between light projected from each of the at least two projection devices.

38.- A stereoscopic projection system according to any of the previous claims, wherein the projection device is an LCD or an LCoS device.

39.- A stereoscopic projection system according to any of the previous claims, comprising a plurality of stereo projection devices for multiple image stereo applications.

40.- A stereoscopic projection system according to any of the previous claims, wherein said filtering in a color selective manner reaches a common color gamut for the images for the left and right eye.